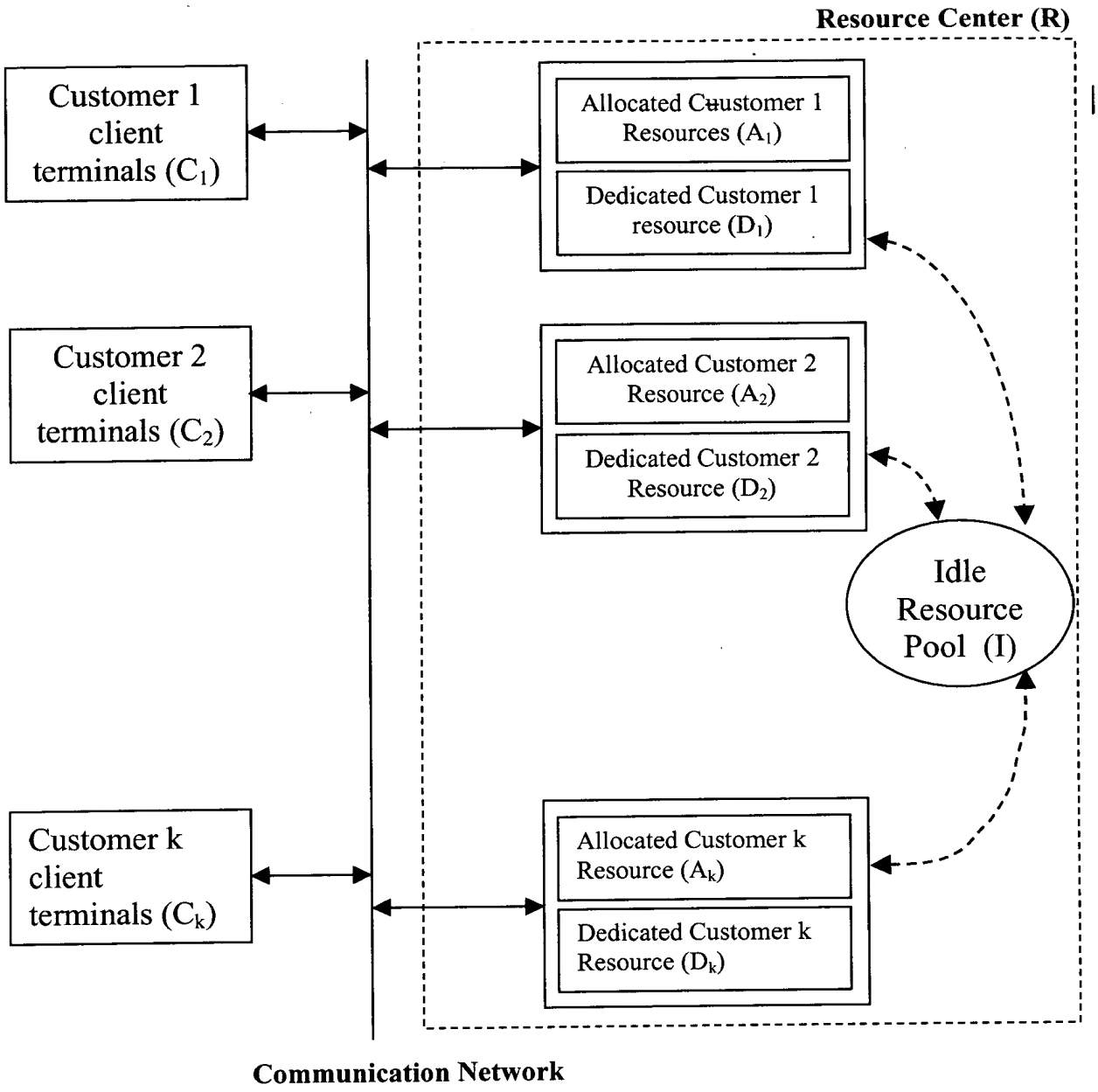
Resource Center (R)
Customer 1 client terminals (C_1)
Allocated Customer 1 Resources (A_1)
Dedicated Customer 1 resource (D_1)
Customer 2 client terminals (C_2)
Allocated Customer 2 Resource (A_2)
Dedicated Customer 2 Resource (D_2)
Idle Resource Pool (I)
Customer k client terminals (C_k)
Allocated Customer k Resource (A_k)
Dedicated Customer k Resource (D_k)
Communication Network

Figure 1

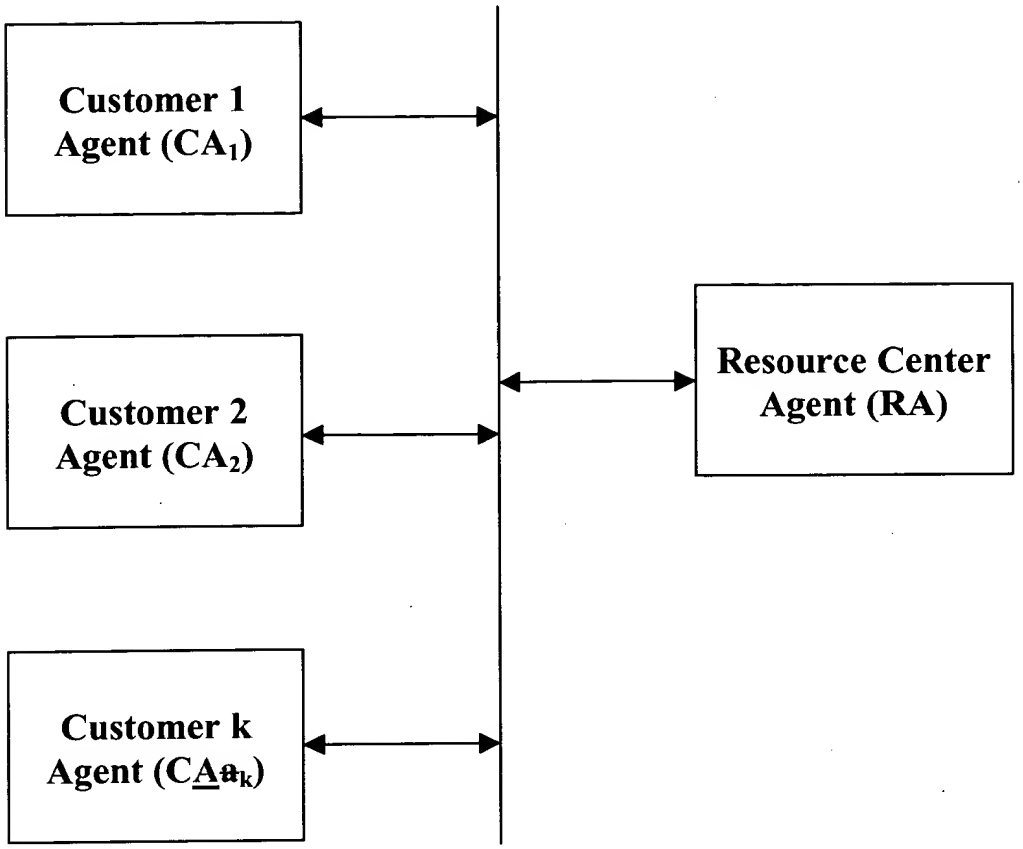
Customer 1 Agent (CA_1)
Customer 2 Agent (CA_2)
Customer k Agent (CA_k)
Resource Center Agent (RA)
Communication Network

Figure 2

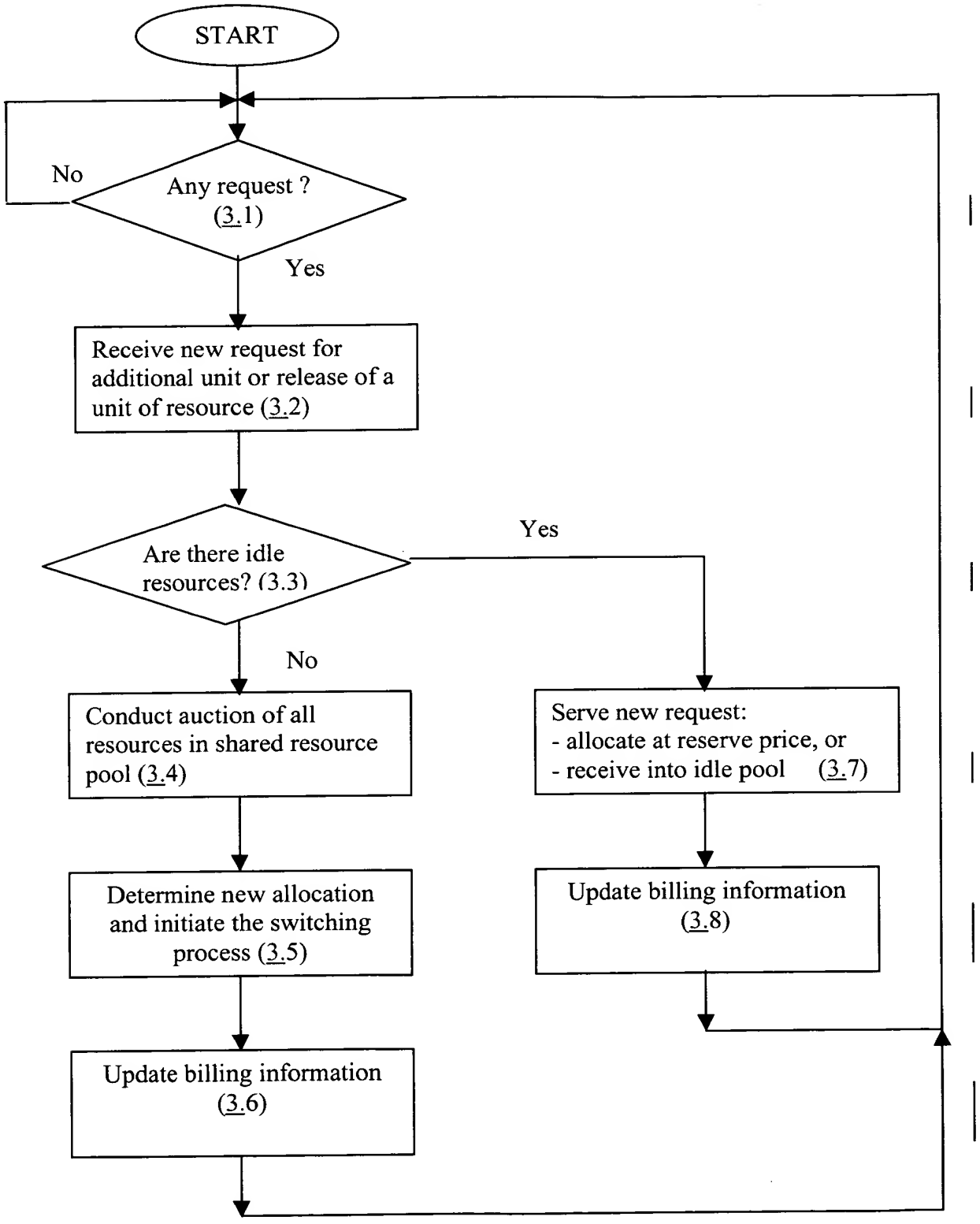
START
Any request ? (3.1)
No
Yes
Receive new request for additional unit or release of a unit of resource (3.2)
Are there idle resources? (3.3)
Yes
No
Conduct auction of all resources in shared resource pool (3.4)
Determine new allocation and initiate the switching process (3.5)
Update billing information (3.6)
Serve new request:
- allocate at reserve price, or
- receive into idle pool (3.7)
Update billing information (3.8)

Figure 3

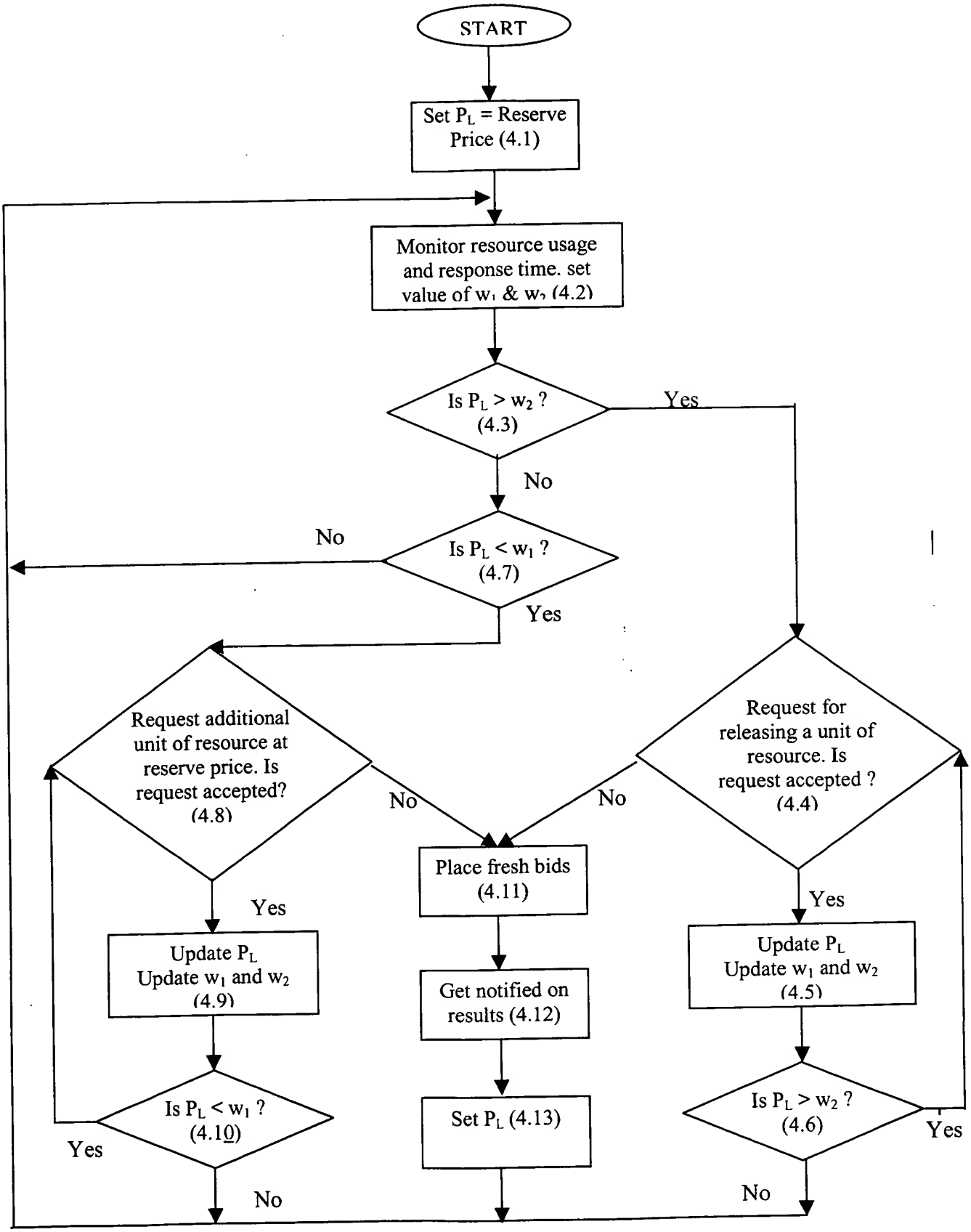
START
Set P_L = Reserve Price (4.1)
Monitor resource usage and response time. set value of w_1 & w_2 (4.2)
Is $P_L > w_2$? (4.3)
Yes
No
Is $P_L < w_1$? (4.7)
No
Yes
Request additional unit of resource at reserve price. Is request accepted? (4.8)
No
Yes
Request for releasing a unit of resource. Is request accepted ? (4.4)
No
Yes
Update P_L Update w_1 and w_2 (4.9)
Place fresh bids (4.11)
Update P_L Update w_1 and w_2 (4.5)
Get notified on results (4.12)
Is $P_L < w_1$? (4.10)
Yes
No
Set P_L (4.13)
Is $P_L > w_2$? (4.6)
Yes
No

Figure 4

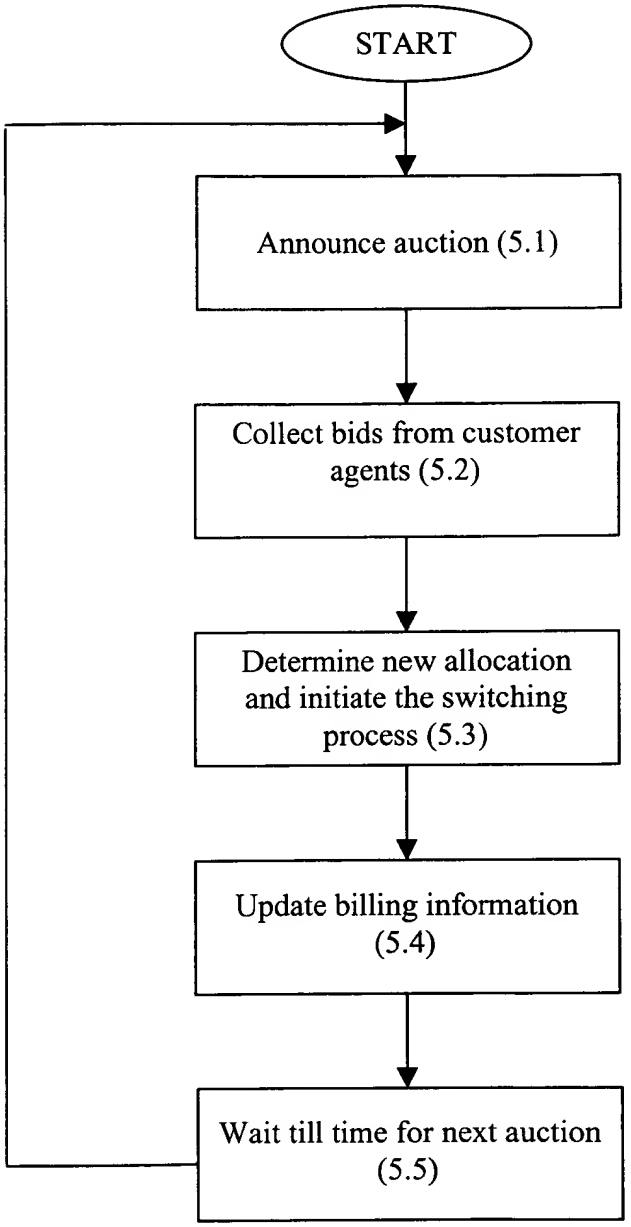
START
Announce auction (5.1)
Collect bids from customer agents (5.2)
Determine new allocation and initiate the switching process (5.3)
Update billing information (5.4)
Wait till time for next auction (5.5)

Figure 5

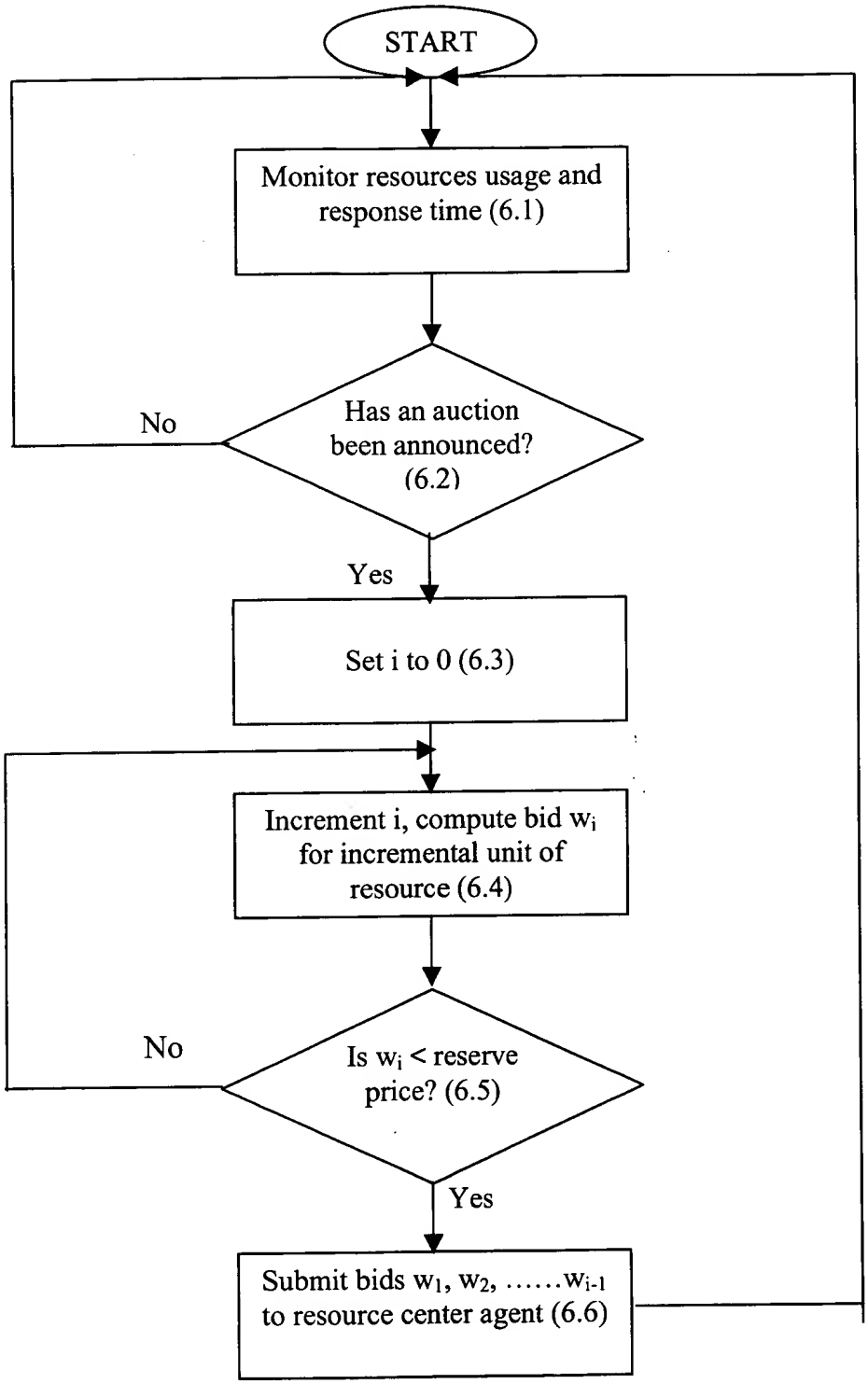
START
Monitor resources usage and response time (6.1)
Has an auction been announced? (6.2)
No
Yes
Set i to 0 (6.3)
Increment i, compute bid w_i for incremental unit of resource (6.4)
Is w_i < reserve price? (6.5)
No
Yes
Submit bids w_1, w_2, ... w_{i-1} to resource center agent (6.6)

Figure 6

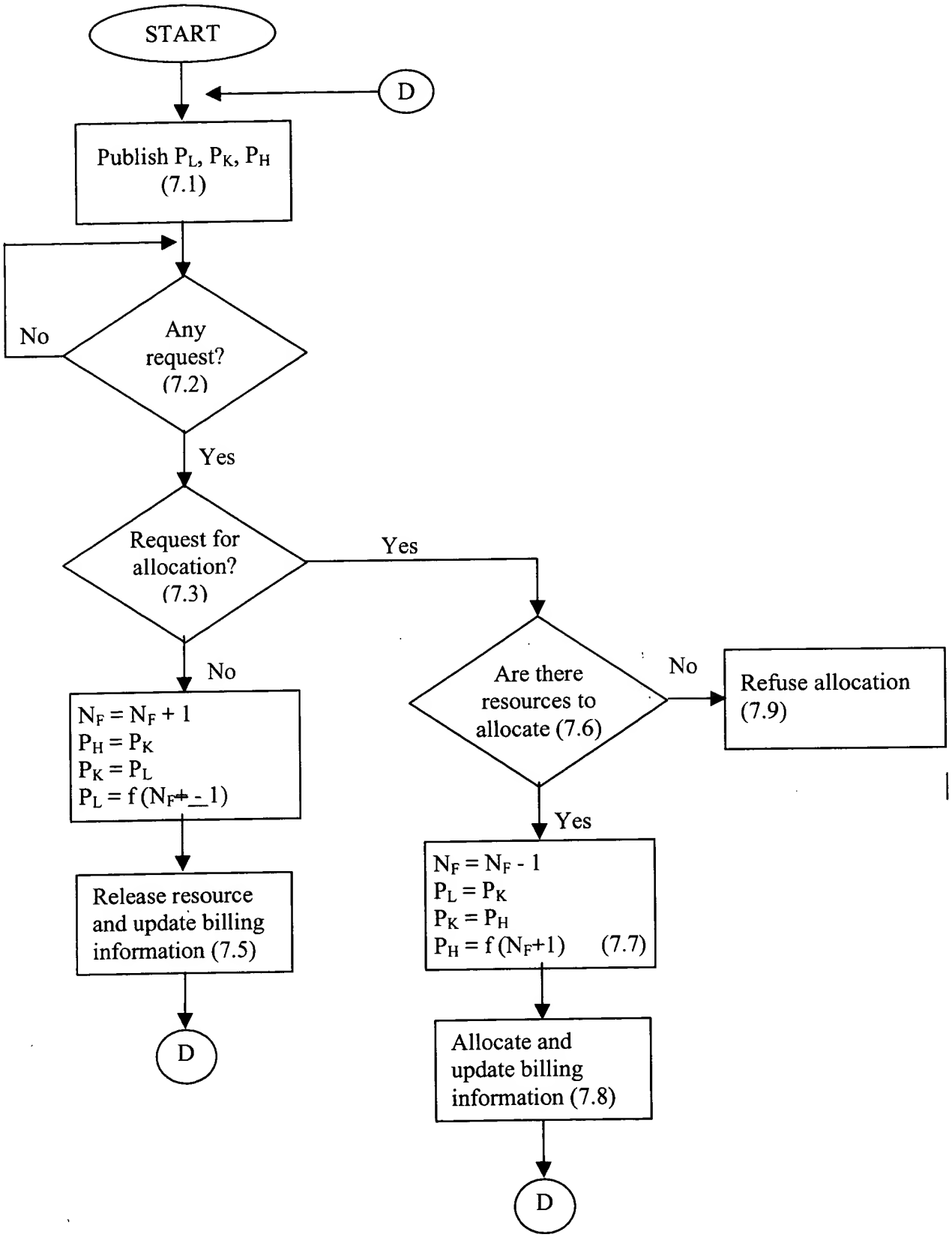
START
D
Publish P_L, P_K, P_H (7.1)
No
Any request? (7.2)
Yes
Request for allocation? (7.3)
Yes
No
$N_F = N_F + 1$
$P_H = P_K$
$P_K = P_L$
$P_L = f(N_F + 1)$
Release resource and update billing information (7.5)
D
Are there resources to allocate (7.6)
No
Refuse allocation (7.9)
Yes
$N_F = N_F - 1$
$P_L = P_K$
$P_K = P_H$
$P_H = f(N_F+1)$ (7.7)
Allocate and update billing information (7.8)
D

Figure 7

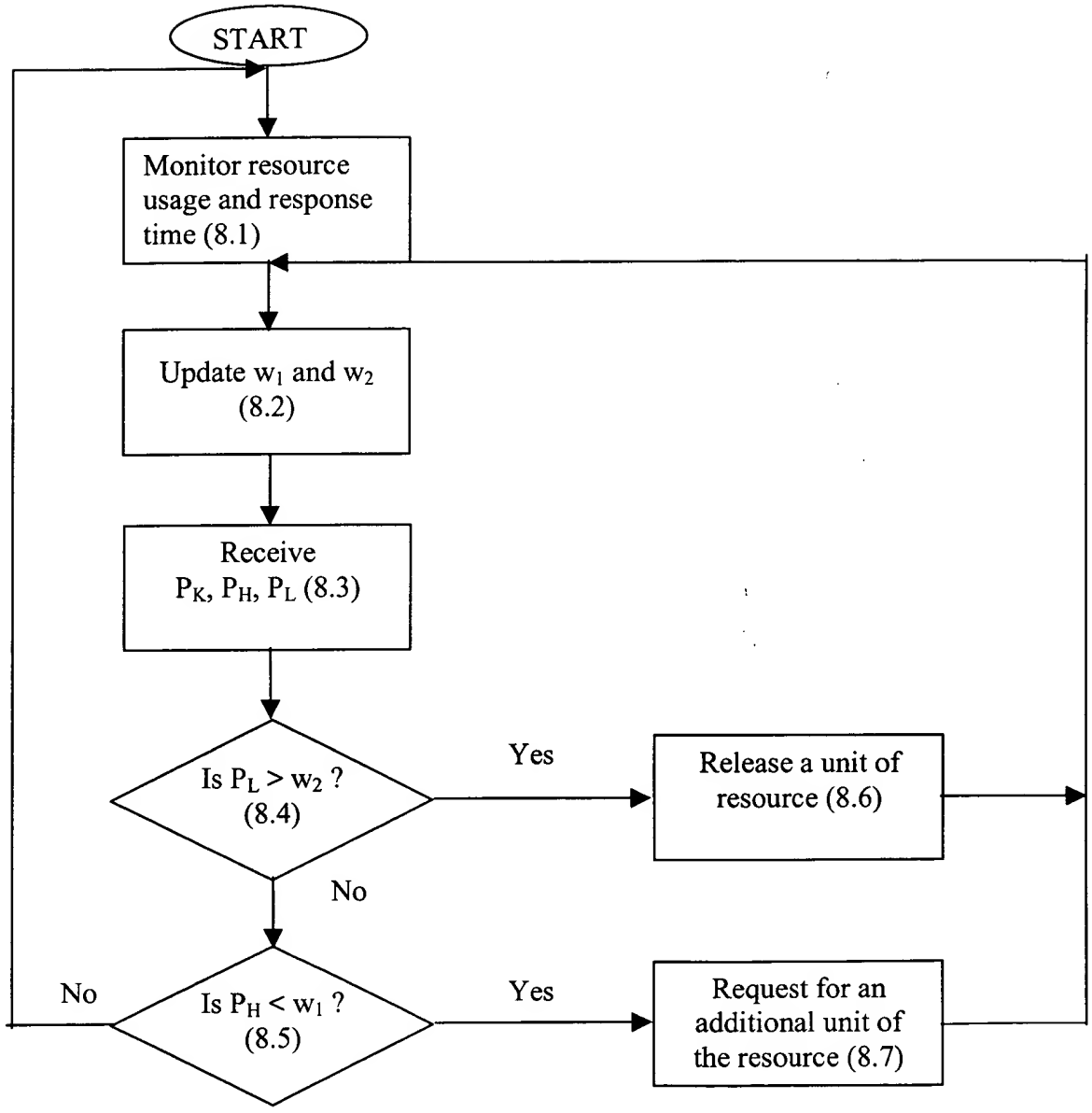
START
Monitor resource usage and response time (8.1)
Update w_1 and w_2 (8.2)
Receive P_K, P_H, P_L (8.3)
Is $P_L > w_2$? (8.4)
Yes
Release a unit of resource (8.6)
No
Is $P_H < w_1$? (8.5)
No
Yes
Request for an additional unit of the resource (8.7)

Figure 8